

COLLECTABLE CARD READERBACKGROUND OF THE INVENTIONField of the Invention

[0001] The present invention relates generally to the automated identification of collectable or playing cards for the purposes of game playing and amusement.

Background and Related Art

[0002] It has long been desirable to have a card reader that can reliably identify an individual collectable or playing card from a plurality of cards. Previous card reader technology was based on mechanical, magnetic, or optical readers. Such card readers were relatively expensive and complicated, and were thus unsuitable as consumer items or for use as toys.

[0003] A related technology is exemplified by U.S. Patent No. 5,088,928 to Chan. Chan describes an Educational/Board Game Apparatus in which an interchangeable game card has symbols associated with the locations of underlying sensors. The game participant presses the symbols in response to prompts from an attached computer. The game card of Chan is associated with particular game. The game cards of Chan are thus not suitable for playing a collectible card game.

[0004] Another related technology is exemplified by U.S. Patent No. 5,190,285 to Levy et al. Levy describes an Electronic Game having Intelligent Game Pieces in which game pieces mate with a game board which contains means for coupling electronic signals to and from each piece. The game pieces of Levy are 'intelligent' in that they include programmable circuitry such as a semi-conductor based device.

The game pieces of Levy are thus not amenable to inexpensive production or disposable use.

[0005] A third related technology is exemplified by U.S. Patent No. 5,997,044 to Behm et al. Behm describes a Document Structure with Circuit Elements in which a lottery ticket includes an electronic circuit for use as a means of verification. The device of Behm seeks to thwart alteration or discovery of a lottery ticket's value. The device of Behm does not, however, associate the electronic circuit with the image on the lottery ticket. Indeed, to do so would negate the uncertainty aspect of a lottery by making the value of the lottery ticket predictable.

SUMMARY OF THE INVENTION

[0006] The present invention is based on conductive ink, printed on the cards, combined with a simple card reader board which plugs into a computer, video game console, or handheld electronic unit. Because the card reader board needs only inexpensive electrical contacts and switches, and the cards are made of an inexpensive material such as cardboard, this card identification technology would lend itself to inexpensive applications, almost to the point of being disposable. In addition, this technology could be used for any conceivable multiple card application where it would be useful for a computer to be able to identify the particular cards. For example, a role playing card game could be supplemented with specific graphics and sound through a personal computer, while still maintaining the original look and feel of a card game.

[0007] In particular, an object of the present invention is to provide a machine readable game card which has a display surface and a readable surface, at least two terminals, and at

least one path arranged on the readable surface between the two terminals, the path having an attribute of a predetermined value measured between the two terminals, and an image arranged on the display surface to which the predetermined value is associated. A further object of the present invention is to provide a reader for identifying a machine readable game card which has a board with a surface, a plurality of pairs of terminals arranged on the surface, a connector, a plurality of circuits connecting each of said pairs of terminals to said connector, wherein a pair of terminals on a machine readable game card contacts a pair of terminals on the reader when the machine readable game card is placed on the surface. A further object of the present invention is to provide an system for playing a game including a plurality of machine readable game cards, a reader for identifying the machine readable game cards, and a computer, video game console, or handheld electronic unit containing a game connected to the reader, wherein the game is played by placing at least one of the machine readable game cards in the reader and identifying it with the computer, video game console, or handheld electronic unit. A further object of the present invention is to provide a method for identifying a game card, comprising the steps of installing a game on a computer, video game console, or handheld electronic unit having a joystick port or any similar device that is capable of reading resistance values, connecting a game card reader to the joystick port, placing a game card with an image and an attribute of a predetermined value associated with that image in the reader, receiving a signal at the joystick port associated with the predetermined value, and storing an identification associated with said signal accessible to said computer.

DESCRIPTION OF THE DRAWINGS

[0008] The invention will be described in detail with reference to the following drawings, in which:

Fig. 1 is a block diagram of a system for playing a card game according to an embodiment of the present invention;

Fig. 2 is a view of a display surface of an embodiment of a game card used in connection with the present invention;

Fig. 3 is a view of a readable surface of an embodiment of a game card used in connection with the present invention;

Fig. 4 is a schematic diagram of a game card reader used in connection with the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0009] In Fig. 1 is shown a block diagram of a system 100 for playing a card game according to an embodiment of the present invention. The system 100 includes a machine readable game card 101, a reader 102 for reading the machine readable game card 101, and a computer 103 connected to the reader 102. Game card 101 is made of an inexpensive material. In a preferred embodiment, game card 101 is made of cardboard, but game card 101 could also be made of, for example, paper, plastic, Styrofoam, particle board, organic material, fiber board, or any equivalent material. Reader 102 is equipped with connector 105, and computer 103 has access to port 106. In a preferred embodiment, port 106 is a component of computer 103. In a preferred embodiment connector 105 is a joystick connector, and port 106 is a joystick port, but connector 105 or port 106 could also be, for example, a serial port, a SCSI port, an optical port, an RS232 adaptor, or any equivalent means of connection, or a device that is capable of reading resistance values. In a preferred embodiment computer 103 is

a personal computer, but computer 103 could also be, for example, a laptop computer, a notebook computer, a handheld electronic device, a palmtop computer, a video game console, a mainframe computer, a mini-computer, a micro-computer, a digital computer, an analog computer, an organic computer, an emulator, a thin client, or any equivalent device. A game 104 is accessible to computer 103. In a preferred embodiment, game 104 is stored on computer 103, but game 104 may also be stored elsewhere, on another device, for example, as long as computer 103 is able to access game 104. In one embodiment, computer 103 is connected to the Internet, and access to game 104 could be acquired over an Internet connection. Computer 103 could also access game 104 over an intranet or other equivalent network. In a preferred embodiment, game 104 is a card game, but game 104 could also be, for example, a role-playing game, an adventure game, a fantasy game, a video game, a virtual reality game, a competition game, an educational game, a board game, or any equivalent game. Connector 105 and port 106 are connected with cable 107. In a preferred embodiment, cable 107 is a coaxial cable, but cable 107 could also be, for example, a flat cable, a wireless connection, an infrared connection, an RF connection, an optical fiber, twisted pair, telco cable, or any equivalent means of connecting connector 105 and port 106. Cable 107 is further shown carrying signal 108. In a preferred embodiment, signal 108 is an electrical signal, but signal 108 could also be, for example, an infrared signal, an ultraviolet signal, an RF signal, a microwave signal, an optical signal, radiated baseband, an audio signal, or any equivalent means of transmitting information. In addition, transducer 109 is shown between connector 105 and port 106. Transducer 109 is optional. Transducer 109 would only be necessary if, for

example, the output of connector 105 were incompatible with port 106. If the output of connector 105 were incompatible with port 106, for example, transducer 109 could be used to convert the output of connector 105 to a form that is compatible with port 106, as would be known to one skilled in the art. Transducer 109 could, for example, convert the output of connector 105 into audio tones, if port 106 were an audio port. Transducer 109 could also be, for example, an active filter, a passive filter such as a ferrite, or an amplifier. The placement of transducer 109 is not limited to the location shown in Fig. 1. Transducer 109 could be, for example, placed anywhere along cable 107, or in parallel with cable 107. Transducer 109 could also be, for example, incorporated within reader 102 or computer 103. The exact location of transducer 109 is not critical to the principles of the invention. Computer 103 further includes identification means 110. In a preferred embodiment, identification means 110 identifies game card 101 based on signal 108 as discussed further below, and supplies the identity of game card 101 to computer 103, which causes game 104 to act based on the identity of game card 101.

[0010] In Fig. 2 is shown the display surface 201 of an embodiment of game card 101. An image 202 may be seen to be arranged on display surface 201. In a preferred embodiment, image 202 is a photograph, but image 202 could also be, for example, a painting, a hologram, a drawing, a lithograph, an offset, a bas-relief, an etching, a pictogram, a print, a mirror, a light-emitting diode, a luminescent coating, a reflective coating, a phosphorescent coating, a glow-in-the-dark coating, a magnetic coating, an optical filter or any equivalent medium. Image 202 could also be a means of tactile stimulation, such as a message in the Braille alphabet, if the

game were to be played by the sight-impaired. In a preferred embodiment, image 202 denotes a particular aspect of a computer game. Image 202 may depict or suggest, for example, a character such as a joker, an action such as 'Go Directly to Jail', or a value such as a monetary amount or a quantity of points. In a preferred embodiment, game card 101 is one of a plurality of game cards. Different game cards 101 could bear identical images 202, but in a preferred embodiment, image 202 is unique to a particular game card 101. In a preferred embodiment there will thus be as many images 202 as there are game cards 101, and there will further be a one-to-one mapping of the set of images 202 to the set of game cards 101.

[0011] In Fig. 3 is shown the readable surface 301 of an embodiment of game card 101. In a preferred embodiment, readable surface 301 and display surface 201 shown in Fig. 2 are on opposite sides of game card 101, but they could be on the same side as well. Path 302 is arranged on readable surface 301 between terminals 303 and 304. In a preferred embodiment path 302 is an electrical conductor, but path 302 could also be, for example, a wave guide, a transmission line, or any equivalent medium. In a preferred embodiment path 302 is formed of conductive ink, but path 302 could also be, for example, formed of a metal such as copper or aluminum, an amorphous, polymorphous or crystalline semiconductor, an insulator, a polymer, an optical fiber, a suspension, or any equivalent substance. One skilled in the art will know that conductive ink is also known as conductive paint or coating; resistive ink, paint, or coating; electrical ink, paint, or coating; or metal or metallized ink, paint, or coating. Conductive ink may be formulated to produce a specific electrical resistance value when printed as a path of a given thickness, width, and length on a suitable substrate. A given

ink formulation will have a certain resistivity. The resistance of a path made of conductive ink of a given formulation will vary with the length of the path and inversely with the width and the thickness. To obtain varying resistance values the path pattern can be varied in length, thickness, and width. In the alternative, the chemical formulation of the conductive ink can be varied to obtain different values of resistivity. An electrical multi-meter or similar device can be used to measure the resistance value of a conductive ink path. In particular, the joystick port on a personal computer can be used to indirectly measure the resistance, producing a value which is relative to the resistance value.

[0012] An attribute 305 is associated with path 302. Attribute 305 has a predetermined value. The predetermined value of attribute 305 of path 302 on the readable surface 301 of a particular game card 101 is associated with image 202 on the display surface 201 of the same game card 101 as shown in Fig. 2. In a preferred embodiment the predetermined value of attribute 305 of path 302 on the readable surface 301 of a particular game card 101 is unique to image 202 on the display surface 201 shown in Fig. 2. Since game card 101 may be one of a plurality of game cards 101, in a preferred embodiment there will exist a one-to-one mapping between the predetermined value of attribute 305 on a particular game card 101 and the image 202 on the same game card 101. In a preferred embodiment, attribute 305 is a resistance, but attribute 305 could also be, for example, an impedance, an inductance, a capacitance, an electrical length, a delay, a phase shift, a resonant mode, a transmissivity, an attenuation, a voltage drop, a frequency response, or any equivalent attribute. In a preferred embodiment attribute 305

is measured between terminals 303 and 304. If attribute 305 were a resistance, for example, then the predetermined value might be measured between terminals 303 and 304 in units such as ohms or Siemens. Any suitable system of units will do, however, since one skilled in the art will know that a system of units is simply an arbitrary scale factor. Measuring a proxy for resistance, such as the voltage drop across terminals 303 and 304, or current flow in a circuit in parallel to path 302, would also be within the scope of the principles of the invention.

[0013] In Fig. 4 is shown a schematic diagram of an embodiment of a game card reader 102 used in connection with the present invention. Card reader 102 includes a board 401 having a reader surface 402. Terminals 403 and 404 are arranged on reader surface 402. A connector 105 is shown installed on game card reader 102. A circuit 405 connects terminals 403 and 404 to connector 105. A game card 101 as shown in Fig. 1 is read by placing game card 101 on reader surface 402 so that readable surface 301 shown in Fig. 3 is proximate to reader surface 402, and terminals 303 and 304 shown in Fig. 3 are in contact with terminals 403 and 404. When terminals 303 and 304 are in contact with terminals 403 and 404, path 302 arranged on readable surface 301 between terminals 303 and 304 shown in Fig. 3 completes circuit 405, allowing signal 108 to be transmitted over path 302. In the alternative, a switch 406 can be placed in series with terminals 403 and 404 to complete circuit 405 when switch 406 is asserted. In a preferred embodiment, signal 108 is related to the predetermined value of attribute 305. Since there is a one-to-one mapping between the predetermined value of attribute 305 and the image 202 on a particular card, identification means 110 in computer 103 identifies game card

101 by measuring signal 108 through port 106. Several cards could be measured simultaneously or sequentially by providing further circuits connected in parallel with circuit 405.

[0014] One skilled in the art will know that there many are equivalent means of identifying game card 101 by determining the predetermined value of attribute 305 within the principles of the invention. If, for example, signal 108 were a direct current (DC) electrical signal and attribute 305 were a resistance, then the predetermined value of attribute 305 could be measured by measuring the voltage drop across terminals 303 and 304, or the current through a circuit in parallel with path 302, in the manner of a current divider. If, for example, signal 108 were an alternating current (AC) electrical signal and attribute 305 were the impedance of path 302, then the predetermined value of attribute 305 could be measured by measuring the voltage drop across terminals 303 and 304, the current through a circuit in parallel with path 302 in the manner of a current divider, the charge accumulated in an active device such as a capacitor that is in series with path 302, or the flux linkage in an active device such as an inductor that is in parallel with path 302. If, for example, signal 108 were an AC electrical signal and attribute 305 were the electrical length of path 302, then the predetermined value of attribute 305 could be measured by measuring the phase shift or the delay experienced by AC signal 108 as it traversed path 302. If, for example, signal 108 were an RF signal of one frequency, such as a clock signal, or of several different frequencies, such as band-limited white noise, and attribute 305 were the frequency response of path 302, then the predetermined value of attribute 305 could be measured by measuring the attenuation or phase shift or delay of AC signal 108 after it had traversed path 302. If, for example, signal

108 were an optical signal of a given wavelength and attribute 305 were the refractive index or the transmissivity of path 302, then the predetermined value of attribute 305 could be measured by measuring the amount of light passing through path 302, for example, by measuring the light incident on one of terminals 304 or 304.

[0015] The invention having been thus described, it will be apparent to those skilled in the art that the same may be varied in many ways without departing from the spirit and scope of the inventions. All such modifications are intended to be encompassed by the following claims.